

NEW TRILOBITE SPECIES FROM THE ANTHRACOLITHIC OF NORTHERN CALIFORNIA¹

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The first recorded trilobites from the late Paleozoic of California were collected in 1892 by H. W. Fairbanks² from the Baird formation near the U. S. Government Fish Hatchery on the McCloud River. His two fragmentary specimens were referred by A. W. Vogdes³ to *Proetus ellipticus* Meek and Worthen, a species from the Kinderhook group of Illinois.

Unfortunately, Fairbanks' specimens are no longer available for study. Nevertheless, several pygidia collected by J. P. Smith⁴ the following year, and referred by him to the same species, are still in the Stanford collection. These, together with a specimen which Professor Muller and I collected in 1931, form the basis for the present description of the Baird species.

The Nosoni formation (Permian) has yielded the other trilobite species described in the following paper.

Genus PROETUS Steininger, 1830
Genotype: *Proetus cuvieri* Steininger, 1830
Proetus bairdensis Wheeler, new species

Plate 6, figs. 1-3

1892. ?*Proetus ellipticus* Meek and Worthen, Vogdes, A. W., "Proceedings

¹ Read before the Paleontological Society of America, Pacific Coast Branch, Berkeley meeting, April 14, 1934.

² Fairbanks, H. W., "Geology and Mineralogy of Shasta County," 11th Rep. Calif. State Mineral., p. 39, 1893.

³ "Notes on some Localities of Mesozoic and Paleozoic in Shasta County, California," Amer. Geol., vol. 14, no. 1, p. 29, 1894.

⁴ Zool., vol. 3, p. 274, 1892. Under the heading of "Proceedings of the Societies, California Academy of Science, Oct. 17, 1892," appears the following quotation: "The secretary read an announcement of the discovery by H. W. Fairbanks of *Proetus ellipticus* Meek, a trilobite from the Waverly Group, in Shasta County, California, identified by Captain A. W. Vogdes."

⁵ Smith, J. P., "The Metamorphic Series of Shasta County, California," Jour. Geol., vol. 2, no. 6, p. 595, 1894.

of the Societies, California Academy of Science [meeting], Oct. 17, 1892," *Zoe*, vol. 3, p. 274.

1894. *?Proetus ellipticus* Meek and Worthen, Fairbanks, H. W., "Notes on some Localities of Mesozoic and Paleozoic in Shasta County, California," *Amer. Geol.*, vol. 14, no. 1, p. 29.

1894. *Proetus ellipticus* Meek and Worthen, Smith, J. P., "The Metamorphic Series of Shasta County, California," *Jour. Geol.*, vol. 2, no. 6, p. 595.

Not *Proetus ellipticus* Meek and Worthen, *Geol. Surv. Illinois*, vol. 3, p. 460, pl. 14, fig. 3, 1868.

Description.—The specimens of this species now available for study are imperfectly preserved fragments of pygidia, an external mold of one individual showing the pygidium, thorax and part of the glabella, and a free cheek (probably of the same individual).

Although the anterior border of the cephalon is unknown, the remaining outline suggests the general form of an elongate ellipse.

The cephalon is straight at the sides, the genal angles being drawn out into slender spines which extend backward to about the fifth thoracic segment. The lateral borders (and probably the anterior as well) are folded upward to form a raised border which is separated from the cheeks by a deep furrow. The occipital ring is about twice as wide as a thoracic segment, and is raised above the level of the highest part of the glabella. These two structures are separated by a distinct groove which extends laterally across the cheeks to the marginal furrow, which it intersects perpendicularly. The posterior-lateral lobes of the glabella stand in low relief, and are bordered anteriorly by shallow lateral furrows which extend obliquely backward to intersect the neck furrow.

The thorax is about one-third wider than long, and consists of nine segments. The moderately arched axis is about equal in width to the lateral lobes, from which it is separated by well-defined dorsal furrows. The lateral lobes are depressed below the axis, are somewhat flattened near the dorsal groove, bend downward at the fulcral point, and are flattened again from there to the margin. Each of the pleuræ is marked by a median groove inside the fulcral point.

The pygidium is sub-semicircular, is nearly twice as wide as long, and is of moderately high convexity. It bears about thirteen axial, and eight or nine pleural segments. The axial lobe is prominent, its anterior width being a little greater than that of the lateral lobes. The top of the axis is flattened, and the sides slope steeply to the furrows. The pygidium is entirely surrounded by a smooth marginal border of approximately the same width at all points.

Comparisons and affinities.—This species is in many respects similar to *Proetus ellipticus* Meek and Worthen from the Kinderhook of Illinois, to which it was referred by both Vogdes and Smith. However the Baird species possesses a greater number of segments in the thorax and in both the axial and pleural lobes of the pygidium. Furthermore, both the pygidial axis and the entire pygidium are relatively wider in *Proetus bairdensis* than in the Kinderhook species.

Holotype.—Stanford Univ. Paleo. Type Coll., catalogue no. 777-a.

Paratype.—Stanford Univ. Paleo. Type Coll., catalogue no. 777-b.

Plastotype.—San Diego Society of Natural History Trilobite Coll., catalogue no. 272.

Type locality.—L. S. J. U. loc. 1041, Redding Quadrangle, Shasta County, California. Highly indurated buff colored shale on crest of spur in the S. W. $\frac{1}{4}$ of the S. E. $\frac{1}{4}$, sec. 14, T. 34 N., R. 4 W. Elevation 1000 feet.

Formation and age.—Baird formation. The age of the strata at this locality has not as yet been precisely determined. I have shown elsewhere⁵ that the *Gigantella*-bearing strata of the Baird formation (which apparently lie stratigraphically below the beds at the *Proetus bairdensis* locality) are of latest Dinantian age. On the basis of stratigraphic position, therefore, it is probable that the strata at the type locality of *P. bairdensis* belong to the Lower Moscovian stage.

Collectors.—S. W. Muller and H. E. Wheeler, 1931.

Genus GRIFFITHIDES Portlock, 1843

Genotype: *Griffithides longiceps* Portlock, 1843

Griffithides nosoniensis Wheeler, new species

Plate 6, figs. 6 and 7

Description.—Although the posterior portion of the pygidium is unknown, the outline of the remainder of the specimen suggests an elongate ellipse as the general form. The greatest width is probably about eight-thirteenths of the length. Measured along the axis, the length of the cephalon is nearly equal to the length of the thorax.

The outline of the cephalon (including the spines) forms slightly more than half of an ellipse. The spines extend backward to about the sixth thoracic segment. The glabella, which is of low convexity, is pyriform, and is especially expanded anteriorly. It is marked by two pairs of obsolete lateral furrows which extend inward from the forward portion of the broad and deep grooves which lie in front of the basal lobes. The occipital ring, whose width is about one-third greater than that of a thoracic segment, is marked anteriorly by a broad furrow. The surface of the eyes has been removed, and, in consequence, their exact form is unknown.

The thorax consists of nine segments. The axis, which is moderately arched, is slightly wider than the lateral lobes, and is separated from them by deep dorsal furrows. The pleurae are also moderately arched, their crests being at the fulcral points, where they bend rather abruptly downward and slightly backward.

The pygidium, which is known only in part, is of fairly low convexity, bears

⁵ Wheeler, H. E., "The Carboniferous-Permian Dilemma," Jour. Geol., vol. 42, no. 1, p. 68, 1934.

a greater number of axial than lateral segments (as judged from the forward portion), and possesses, at least anteriorly, a narrow and smooth border.

Comparisons and affinities.—Among the known trilobites, *Griffithides nosoniensis* most closely resembles *G. acanthiceps* Woodward from the Carboniferous limestone of England. The Nosoni species differs from *G. acanthiceps* in the greater anterior expansion of its glabella, its proportionally shorter cephalon, its wider and more anteriorly arched occipital ring, and its obsolete lateral grooves on the glabella.

Holotype.—Stanford Univ. Paleo. Type Coll., catalogue no. 778.

Plastotype.—San Diego Society of Natural History Trilobite Coll., catalogue no. 272.

Type locality.—L. S. J. U. loc. 1034, Redding Quadrangle, Shasta County, California. Dark shale on the south side of the ridge south of Potter Creek, about 250 feet stratigraphically above the McCloud-Nosoni contact. Elevation 1800 feet. N. E. $\frac{1}{4}$ of the S. W. $\frac{1}{4}$, sec. 24, T. 34 N., R. 4 W.

Formation and age.—Nosoni formation, Permian (Kungurian?).

Collectors.—S. W. Muller and H. E. Wheeler, 1931.